

Final

Close-Out Report

Site 16 - Chemical Fire, Building X-136

**Naval Station Norfolk
Norfolk, Virginia**



**Prepared for
Department of the Navy
Atlantic Division
Naval Facilities Engineering Command**

**Under the
LANTDIV CLEAN II Program
Contract N62470-95-D-6007
Contract Task Order 0075
May 2002**

Prepared by



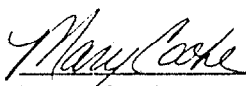
CH2MHILL

Virginia Beach, Virginia

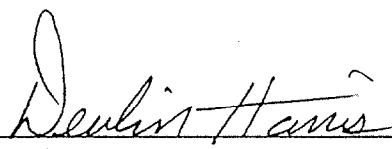
Final

Close-Out Report
Site 16 - Chemical Fire, Building X-136
Naval Station Norfolk
Norfolk, Virginia

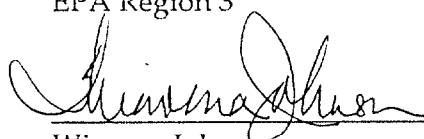
In accordance with the Federal Facilities Agreement for the Naval Station Norfolk, signed February 1999, a Closeout Report was completed for Site 16 - Chemical Fire, Building X-136. The site Project Managers and members of the Naval Station Norfolk Tier I Partnership determined that no further action is required and the land use will be unrestricted at the site. This evaluation was based on consideration of field sampling data for soil and groundwater, risk screening, and professional judgement. In the event contamination posing an unacceptable risk to human health or the environment is discovered after execution of this site closeout report, the Partnership agrees to remediate the contamination if deemed necessary.

 17 May 2002


Mary Cooke Date
Project Manager
EPA Region 3

 5/29/02

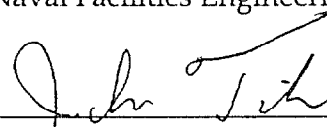
Devlin Harris Date
Project Manager
Virginia DEQ

 5/17/02

Winoma Johnson Date
Project Manager
Naval Facilities Engineering Command

 5/10/02

Randy Sawyer Date
IR Program Coordinator
Navy PWC, Norfolk

 5/12/02

John Tomik Date
Project Manager
CH2M HILL

Table of Contents

Table of Contents.....	iii
1.0 Introduction	1-1
Site Description	1-1
Summary of Previous Investigations.....	1-1
2.0 Field Activities	2-1
3.0 Risk Characterization.....	3-1
Subsurface Soil	3-1
Groundwater	3-1
Human Health Risk Assessment.....	3-2
Ecological Risk Assessment	3-2
4.0 Conclusions and Recommendations.....	4-1
5.0 References	5-1

Figures

Figure 1-1 Location Map	1-3
Figure 1-2 Site 16 Area Map	1-4
Figure 2-1 Sampling Locations Map	2-2
Figure 3-1 Exceedances Map	3-7

Tables

Table 3-1 Subsurface Soil Exceedances, Baker RRR Study	3-3
Table 3-2 Groundwater Exceedances, Baker RRR Study	3-4
Table 3-3 Groundwater Exceedances, CH2M HILL Site Investigation Study	3-5
Table 3-4 Groundwater Exceedances, CH2M HILL Additional Sampling	3-6

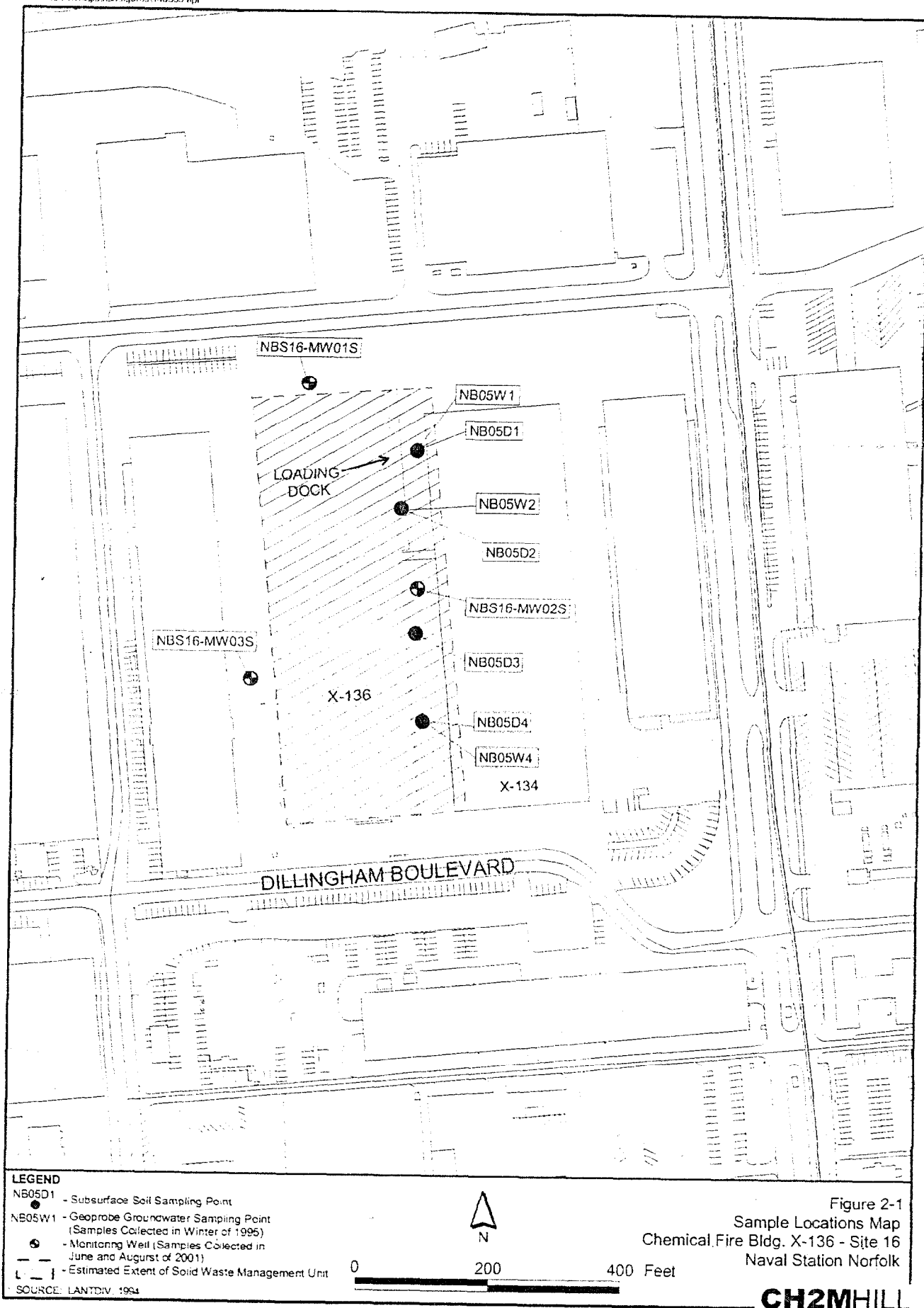
2.0 Field Activities

This section presents information regarding the sampling activities conducted at Site 16. Details on the number of samples collected, collection methods, sampling locations, and sample analysis are provided below.

During the 1996 Phase I RRR study, a total of seven samples (4 subsurface soil and 3 grab groundwater) were collected for analysis. Sample locations and selection of analyte parameters were based on a site reconnaissance and site history review performed prior to the field sampling event. See Figure 2-1 for locations where samples were collected. The samples were analyzed for Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs), Target Analyte List (TAL) Metals and Cyanide, Target Compound List (TCL) Pesticide and Polychlorinated Biphenyls (PCBs).

During the 2001 Supplemental Investigation, three monitoring wells were installed and subsequently groundwater samples were collected. The monitoring well locations (See Figure 2-1) were selected based on a review of the existing analytical data and presented in a work plan (CH2M HILL, 2001) approved by the Naval Station Norfolk Tier I Partnering Team. The monitoring wells were installed at depths ranging from 15 to 16 feet below ground surface (bgs) based upon the depth to first encountered water. The wells were constructed of 2-inch diameter PVC well casings with 10-foot well screens. The monitoring wells were installed using a hollow stem auger (HSA) drill rig with 4¼" inner diameter auger stems. Groundwater samples were analyzed for VOCs.

The groundwater sample collected in August of 2001 was collected from the existing monitoring well, MW01S (See Figure 2-1 for location). The sample was analyzed for VOCs.



3.0 Risk Characterization

The following section presents the interpretation of the analytical data from the 1996 Phase I RRR study, 2001 Supplemental Investigation, and August 2001 groundwater sample. The discussion includes the identification of screening/regulatory criteria exceedances, as well as exceedances of upgradient, background and offsite concentrations. Concentrations of detected chemicals were compared to the following current USEPA screening and regulatory screening criteria for each sample matrix: USEPA Region III residential and industrial risk-based concentrations (RBCs) for soil, and USEPA Region III tap water RBCs, and primary drinking water Maximum Contaminant Levels (MCLs) for groundwater.

Subsurface Soil

The analytical results from the 1996 Phase I RRR Study (Baker 1996) show that there were few exceedances detected for the analytes above residential or industrial soil RBCs. No VOCs exceeded the screening criteria in soil. One semi-volatile organic compound, Benzo(a)pyrene, exceeded its residential and industrial RBC for soil. Benzo(b)fluoranthene exceeded its residential RBC for soil, but not the corresponding industrial RBC. Pesticides and PCBs were not detected at levels that exceeded any corresponding RBC values. Arsenic, ubiquitous in this geographic region, was the only inorganic compound detected above its industrial soil ingestion RBC or above its residential soil ingestion RBC. A comparison of the detected compounds with the residential soil RBCs is given in Table 3-1. Exceedance information is also presented in Figure 3-1.

The Soil Background Investigation of Naval Station Norfolk (CH2M HILL, 2000) shows that the background soil arsenic concentrations are typically elevated at the base with ranges of 12.7 mg/L to 28.6 mg/L. Therefore, it is likely that the arsenic concentrations detected at the site are due to background conditions and are not site-related.

Groundwater

The groundwater results from the 1996 Phase I RRR Study (Baker 1996) showed exceedances of the tapwater RBCs for the following organic compounds: 1,2 dichloroethene (1,2-DCE), benzene, trichloroethene (TCE), and naphthalene. The maximum concentrations for 1,2-DCE and TCE also exceeded their respective MCLs. The inorganic analysis showed that there was a RBC and MCL exceedance for arsenic as well as an RBC exceedance for iron. In addition, the lead concentration slightly exceeded the National Primary Drinking Water Action Level of 15 ug/L at one location. However, the arsenic concentrations are typically elevated in this region and inorganics are not expected to be site related contaminants. The elevated levels of inorganics may be attributable to background. These results are presented in Table 3-2. The 1996 groundwater samples were collected using a Geoprobe, which is allowed by EPA and DEQ to be used only as a qualitative tool for the assessment of groundwater quality data. As a result, in 2001 three groundwater monitoring wells were installed at Site 16 to provide more quantitative and updated groundwater data for the site.

The groundwater results from the 2001 Investigation Report (CH2M HILL 2001) show that there was one MCL exceedance at monitoring well MW01S. The exceedance was for vinyl chloride (VC). In addition, TCE and VC exceeded their respective tap water RBCs. Exceedance information is presented in Table 3-3. In Figure 3-1, data from the August 2001 sampling event replaced the sampling from the Investigation Report for monitoring well MW01S.

In August of 2001, MW01S was resampled for VOCs. No VOCs, including VC, were detected at levels above their MCLs. Exceedance Information is presented in Table 3-4 and Figure 3-1.

Human Health Risk Assessment

A qualitative assessment for human health indicates the site is not expected to pose an unacceptable risk to human health due to the low level of contamination and limited exposure pathways.

Ecological Risk Assessment

A qualitative assessment for ecological risk indicates the site is not expected to pose an unacceptable ecological risk due to the low level of contamination and limited pathways by which receptors may be exposed. The site is in an industrialized area where the majority of site soils have been covered with pavement materials. There is minimal potential for exposure through incidental ingestion of contaminated surface soil or direct exposure. The migration of contamination to sediments or surface water through groundwater or runoff would be very slow and is not likely to occur.

Table 3-1 Subsurface Soil Exceedances Baker RRR Study Naval Station Norfolk					
Station ID	RBC-Soil	NB05			
Sample ID	Residential	NB05D1	NB05D2	NB05D3	NB05D4
Chemical Name					
Semi-volatile Organic Compounds (UG/KG)					
Acenaphthene	4700000	NA	40 J	NA	NA
Acenaphthylene	—	NA	68 J	NA	NA
Anthracene	23,000,000	NA	660	NA	NA
Benzo(a)anthracene	870	NA	790	NA	NA
Benzo(a)pyrene	87	NA	900	NA	NA
Benzo(b)fluoranthene	870	NA	1400	NA	NA
Benzo(g,h,i)perylene	2,300,000	NA	1900 J	NA	NA
Benzo(k)fluoranthene	8,700	NA	1100	NA	NA
Carbazole	32,000	NA	97 J	NA	NA
Chrysene	87,000	NA	1200	NA	NA
Dibutyl phthalate	—	61 B	NA	NA	NA
Fluoranthene	3,100,000	NA	1700	NA	NA
Fluorene	3,100,000	NA	74 J	NA	NA
Indeno(1,2,3-cd)pyrene	870	NA	250 J	NA	NA
Phenanthrene	2,300,000	NA	330 J	NA	NA
Pyrene	2,300,000	NA	1200	NA	NA
Bis(2-Ethylhexyl)phthalate	46,000	NA	36 J	NA	NA
Pesticide/Polychlorinated Biphenyls (UG/KG)					
4,4'-DDT	1,900	NA	31	NA	NA
Total Metals (MG/KG)					
Aluminum	78,000	8,750	NA	NA	NA
Arsenic	0.43	NA	NA	NA	7.9
Barium	5,500	NA	44.6	NA	NA
Calcium	—	NA	NA	110,000	NA
Chromium	230	NA	18.2	NA	NA
Copper	3,100	NA	14.1	NA	NA
Iron	47,000	NA	NA	NA	16,900
Lead	400	NA	93.5	NA	NA
Magnesium	—	NA	NA	NA	3,560
Manganese	1,600	236	NA	NA	NA
Mercury	23	NA	0.25	NA	NA
Nickel	1,600	NA	NA	NA	10
Potassium	—	NA	NA	NA	1,520
Sodium	—	NA	NA	963.0	NA
Vanadium	550	22.2	NA	NA	NA
Zinc	23,000	NA	126	NA	NA

Exceeds one or more criteria

NA: Not Analyzed

B-Analyte Not detected above associated blank

J- Reported value is estimated

Table 3-3
Groundwater Exceedances
CH2M HILL Site Investigation Report
Naval Station Norfolk

Station ID	RBC-Tap	MCL-Ground water	NBS16-MW01S		NBS16-MW02S	NBS16-MW03S
Sample ID			NBS16-MW01S-P-R01	NBS16-MW01S-R01	NBS16-MW02S-R01	NBS16-MW03S-R01
Sample Date			06/28/01	06/28/01	06/28/01	06/28/01
Chemical Name						
Volatile Organic Compounds (UG/L)						
Acetone	610	—	2.4 B	10 UJ	40 J	2 B
Toluene	750	1,000	10 U	10 U	1.2 J	10 U
Trichloroethene	1.6	5	2.9 J	2.9 J	10 U	10 U
Vinyl chloride	0.015	2	2.5 J	2.3 J	10 U	10 U
Xylene, total	12,000	10,000	10 U	10 U	1.3 J	10 U
cis-1,2-Dichloroethene	61	70	29	26	10 U	10 U
trans-1,2-Dichloroethene	120	100	1.1 J	10 U	10 U	10 U

 Exceeds one or more criteria

NA - Not analyzed

B- Analyte not detected above associated blank

J - Reported value is estimated

U - Analyte not detected

Table 3-4 Groundwater Exceedances CH2M HILL Additional Sampling Naval Station Norfolk				
Station ID	RBC- Tap	MCL- Groundwater	NBS16-MW01S	
Sample ID			NBS16-MW01S-P-R02	NBS16-MW01S-R02
Sample Date			08/24/01	08/24/01
Chemical Name				
Volatile Organic Compounds (UG/L)				
Trichloroethene	1.6	5	3.5 J	3.5 U
Vinyl chloride	0.015	2	1.1 J	1.1 U
cis-1,2-Dichloroethene	61	70	28	27
trans-1,2-Dichloroethene	120	100	1 J	10 U

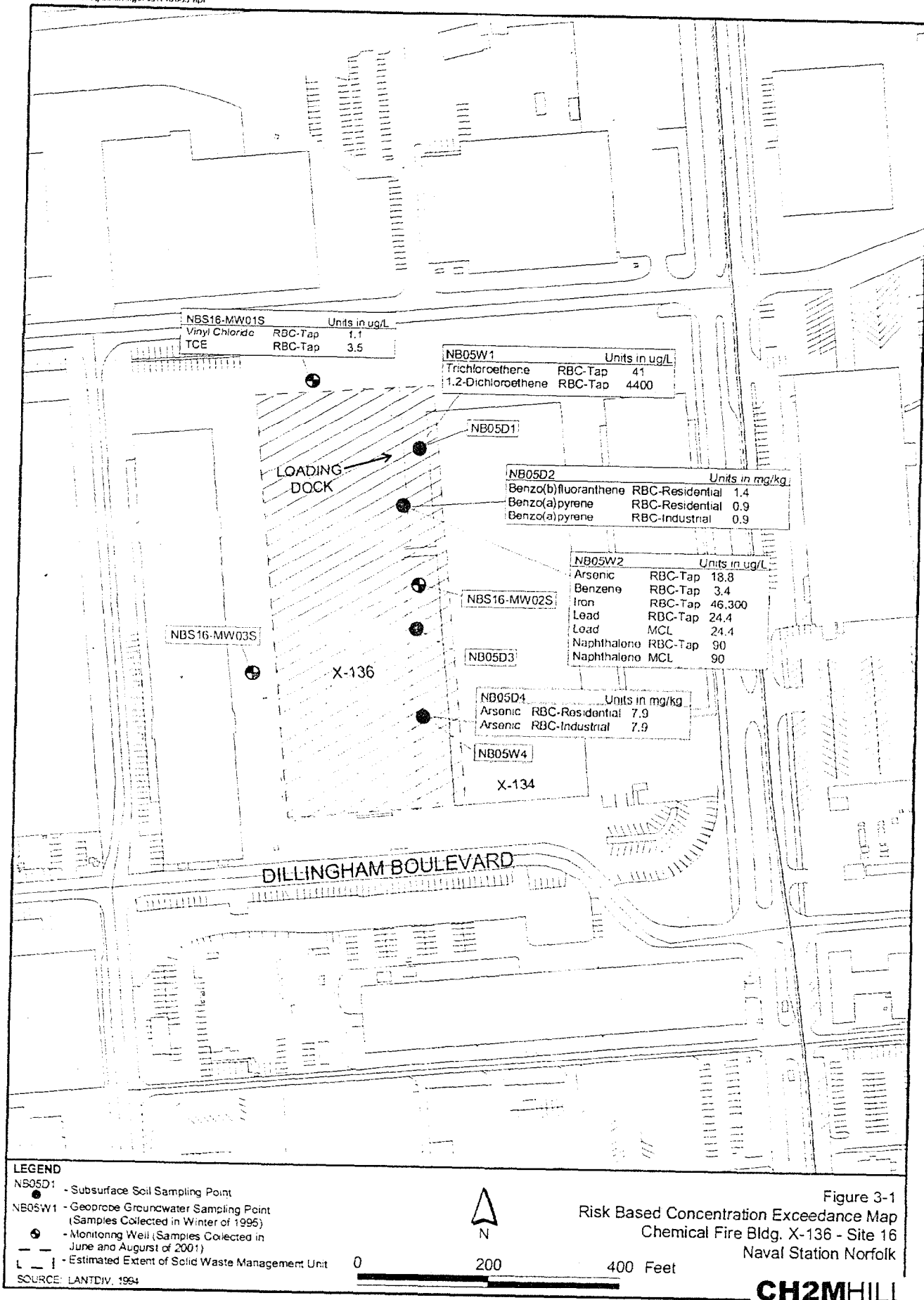
 Exceeds one or more criteria

NA - Not analyzed

B- Analyte not detected above associated blank

J - Reported value is estimated

U - Analyte not detected



4.0 Conclusions and Recommendations

The following conclusions are based upon a complete review of all available analytical data collected during the 1996 Phase I RRR study, 2001 Supplemental Investigation, and the additional 2001 sampling event. The soil analytical data was compared to background data and the current USEPA risk-based residential and industrial concentrations (RBCs) for soil. The groundwater analytical data was compared to the tap water RBCs and the primary drinking water Maximum Contaminant Levels (MCLs).

- The soil analytical results show that there were no VOCs exceeded the screening criteria in soil. One semi-volatile organic compound, Benzo(a)pyrene, exceeded its residential and industrial RBC for soil. Benzo(b)fluoranthene exceeded its residential RBC for soil, but not the corresponding industrial RBC. Pesticides and PCBs were not detected at levels that exceeded any corresponding RBC values. Arsenic was the only inorganic compound detected above its industrial soil ingestion RBC or above its residential soil ingestion RBC. The Soil Background Investigation of Naval Station Norfolk (CH2M HILL, 2000) shows that the background soil arsenic concentrations are typically elevated at the base with ranges of 12.7 mg/L to 28.6 mg/L. Therefore, it is likely that the arsenic concentrations detected at the site are due to background conditions and are not site-related.
- The most recent groundwater results indicate that no compounds were detected above their respective MCLs at the site. Only two compounds, VC and TCE, exceeded tapwater RBCs.

A qualitative assessment for human health indicates the site is not expected to pose an unacceptable risk to human health due to the low level of contamination and limited exposure pathways.

A qualitative assessment for ecological risk indicates the site is not expected to pose an unacceptable ecological risk due to the low level of contamination and limited pathways by which receptors may be exposed. The site is in an industrialized area where the majority of site soils have been covered with pavement materials. There is minimal potential for exposure through incidental ingestion of contaminated surface soil or direct exposure. The migration of contamination to sediments or surface water through groundwater or runoff would be very slow and is not likely to occur.

Based on this evaluation, no further action is recommended for this site.

5.0 References

Baker Environmental Inc., January 1996. Final Relative Risk Ranking System Data Collection Sampling and Analysis Report, Naval Base, Norfolk, Virginia.

CH2MHILL, September 2000. Soil Background Investigation Report, Naval Station Norfolk, Norfolk, Virginia.

CH2M HILL, September 2001. Site Investigation Report for Sites 10, 16, and 18 at Naval Station Norfolk.

Environmental Science and Engineering, Inc., February 1983. Initial Assessment Study, Sewells Point Naval Complex, Norfolk, Virginia.

CH2M HILL, January 2002. Presentation to the Tier I Partnering Team: Results of the Additional Sampling at Site 16.